WE CLAIM

1. An apparatus for performing an assay involving binding between two chemical species comprising, first and second bodies that are releasably fixable together and that together define at least one channel when so fixed, the second body having a surface to which a first chemical species is bound so that the first chemical species lies in the at least one channel, the apparatus being adapted for passage through the at least one channel of a fluid containing a second chemical species for binding between the first and second chemical species in the at least one channel.

2. An apparatus according to claim 1, wherein the first body has a surface having at least one groove formed therein, the surface of the second body sealing against the surface of the first body and closing the at least one groove to form the at least one channel when the bodies are fixed together.

3. An apparatus according to claim 2, wherein the first body comprises a first member having a planar surface including said surface of the first body, and a second member having a planar surface, the planar surfaces of the members being connected together, the second member having an aperture therein which leads to said surface of the first body having said at least one groove formed therein, wherein when the first and second bodies are fixed together at least part of the second body fits within the aperture so as to allow said sealing between said surface of the first body and said surface of the second body.

4. An apparatus according to claim 3, wherein a further at least one groove is formed in the planar surface of the first member and connects with the first mentioned at least one groove, the further at least one groove being closed by the planar surface of the second member to form at least one passage.

5. An apparatus according to claim 1, wherein the first body has an inlet and an outlet, the inlet and the outlet being connected by a flowpath comprising the at least one channel when the bodies are fixed together.

6. An apparatus according to claim 4, wherein the first body has an inlet and an outlet, the inlet and the outlet being connected by a flow path comprising the at least one channel when the bodies are fixed together, and wherein the flowpath also comprises at least part of the at least one passage.

7. An apparatus according to claim 5, wherein the inlet comprises a first connector for connecting a tube to the flowpath and the outlet comprises a second connector for connecting a tube to the flowpath.

8. An apparatus according to claim1, wherein the at least one channel comprises at least two channel parts lying mutually side by side.

9. An apparatus according to claim 8, wherein the at least two channel parts comprise at least four channel parts that are mutually side by side, the at least four channel parts being connected in series by alternating left and right hand curved channel portions.

10. An apparatus according to claim 9, wherein said channel parts are mutually parallel.

11. An apparatus according to claim 1, wherein the at least one channel has a maximum cross-sectional dimension of no more than 500 μm.

12. An apparatus according to claim 11, wherein the maximum dimension is no more than 300 μm.

13. An apparatus according to claim 12, wherein the maximum dimension is no more than 200 μm.

14. An apparatus according to claim 1, further comprising a detector positioned for detecting chemiluminescence in said at least one channel.

15. An apparatus according to claim 14, wherein the detector is a photon multiplier tube.

16. An apparatus according to claim 1, wherein the second body is formed from polydimethylsiloxane (PDMS).

17. An apparatus according to claim 1, wherein the first chemical species is selected from the group consisting of proteins and ligands for proteins.

18. An apparatus according to claim 17, wherein the first chemical species is selected from the group consisting of antibodies and antigens.

19. A method of performing an assay involving binding between two chemical species comprising, providing an apparatus according to claim 1, introducing a sample containing a second chemical species into the at least one channel for binding between the first and second chemical species, and determining an amount of the second chemical species from the sample bound to the first chemical species.

20. A method according to claim 19, wherein said determination utilises measurement of chemiluminescence.

21. A method according to claim 19, further including the step, prior to said introduction, of mixing the sample with a fluid containing a predetermined amount of

the second chemical species, the second chemical species in the fluid but not the second chemical species in the sample being linked to a label, said determination of said bound amount of said second chemical species from the sample comprising determination of an amount of the label bound to the first chemical species.

22. A method according to claim 21, wherein the label is a chemiluminescent label.

23. A method according to claim 22, including the steps of washing said mixture of said sample with said fluid from said at least one channel, and introducing into said at least one channel a reagent that triggers the chemiluminescent label to undergo chemiluminescence.

24. An apparatus for performing an assay involving binding between two chemical species, comprising, a first body having at least one groove formed therein, a second body having a surface that closes the at least one groove to form at least one channel, and a first chemical species bound so as to lie within the at least one channel, the apparatus being adapted for passage through the at least one channel of a fluid containing a second chemical species for binding between the first and second chemical species in the at least one channel.

25. An apparatus according to claim 24, wherein the second body is releasably fixable to the first body, said closure of the at least one groove occurring when the bodies are fixed together.

26. An apparatus according to claim 24, wherein the first and second bodies are permanently fixed together.

27. An apparatus according to claim 24, wherein the at least one groove is formed in a planar surface of the first body, and wherein the surface of the second body is

planar.

28. An apparatus according to claim 24, wherein the at least one channel comprises at least two channel parts lying mutually side by side.

29. An apparatus according to claim 28, wherein the at least two channel parts comprise at least four channel parts that are mutually side by side, the at least four channel parts being connected in series by alternating left and right hand curved channel portions.

30. An apparatus according to claim 29, wherein said channel parts are mutually parallel.

31. An apparatus according to claim 24, wherein the at least one channel has a maximum cross-sectional dimension of no more than 500 μm.

32. An apparatus according to claim 31, wherein the maximum dimension is no more than 300 μm.

33. An apparatus according to claim 32, wherein the maximum dimension is no more than 200 μm.

34. An apparatus according to claim 24, further comprising a detector positioned for detecting chemiluminescence in said at least one channel.

35. An apparatus according to claim 34, wherein the detector is a photon multiplier tube.

36. An apparatus according to claim 24, wherein the second body is formed from

polydimethylsiloxane (PDMS).

37. An apparatus according to claim 24, wherein the first chemical species is selected from the group consisting of proteins and ligands for proteins.

38. An apparatus according to claim 37, wherein the first chemical species is selected from the group consisting of antibodies and antigens.

39. A method of performing an assay involving binding between two chemical species comprising, providing an apparatus according to claim 24, introducing a sample containing a second chemical species into the at least one channel for binding between the first and second chemical species, and determining an amount of the second chemical species from the sample bound to the first chemical species.

40. A method according to claim 39, wherein said determination utilises measurement of chemiluminescence.

41. A method according to claim 39, further including the step, prior to said introduction, of mixing the sample with a fluid containing a predetermined amount of the second chemical species, the second chemical species in the fluid but not the second chemical species in the sample being linked to a label, said determination of said bound amount of said second chemical species from the sample comprising determination of an amount of the label bound to the first chemical species.

42. A method according to claim 41, wherein the label is a chemiluminescent label.

43. A method according to claim 42, including the steps of washing said mixture of said sample with said fluid from said at least one channel, and introducing into said at least one channel a reagent that triggers the chemiluminescent label to undergo

chemiluminescence.

44. An apparatus comprising, first and second bodies, the first body having an aperture therein, the aperture leading to an inner surface of the first body, the inner surface having at least one groove formed therein, the second body having a surface, the first and second bodies being releasably fixable together with at least part of the second body fitting within the aperture so that the surface of the second body seals against the inner surface of the first body and closes the at least one groove to form at least one channel, the apparatus comprising an inlet and an outlet connected by a flowpath, the flowpath comprising the at least one channel.

45. An apparatus according to claim 44, wherein the inner surface of the first body and the surface of the second body are planar.

46. An apparatus according to claim 45, wherein the first body comprises first and second members, the first member having a planar surface including the inner surface, the second member having a planar surface connected to said planar surface of the first member, the aperture being formed in the second member.

47. An apparatus according to claim 46, wherein a further at least one groove is formed in the planar surface of the first member and connects with the first mentioned at least one groove, the further at least one groove being closed by the planar surface of the second member to form at least one passage, the flowpath including the at least one passage.

48. An apparatus according to claim 44, wherein the inlet and the outlet are provided in the first body.

49. An apparatus according to claim 48, wherein the inlet and outlet comprise

respective connectors for connecting tubes to the flow path.

50. An apparatus according to claim 44, wherein the at least one channel comprises at least two channels parts lying mutually side by side.

51. An apparatus according to claim 50, wherein said at least two channel parts comprise at least four channel parts that are mutually side by side, the at least four channel parts being connected in series by alternating left and right hand curved channel portions.

52. An apparatus according to claim 51, wherein said channel parts are mutually parallel.

53. An apparatus according to claim 44, wherein the at least one channel has a maximum cross-sectional dimension of no more than 500μm.

54. An apparatus according to claim 53, wherein the maximum dimension is no more than 300μm.

55. An apparatus according to claim 54, wherein the maximum dimension is no more than 200μm.

56. An apparatus according to claim 44, the apparatus further comprising a chemiluminescence detector for detecting chemiluminescence in said at least one channel.

57. An apparatus according to claim 56, wherein the chemiluminescence detector comprises a photon multiplier tube.

58. An apparatus according to claim 44, wherein the second body is formed from polydimethylsiloxane (PDMS).

59. A method of performing an assay involving binding between two chemical species, comprising, providing a channel having a first chemical species bound therein, introducing a sample containing a second chemical species into the channel for binding between the first and second chemical species, determining an amount of the second chemical species from the sample bound to the first chemical species within the channel by using a chemiluminescence detector to detect chemiluminescence within the channel.

60. A method according to claim 59, wherein the channel has a maximum cross-sectional dimension of no more than 500μm.

61. A method according to claim 60, wherein the maximum dimension is no more than 300μm.

62. An method according to claim 61, wherein the maximum dimension is no more than 200μm.

63. A method according to claim 60, wherein the method further includes, prior to said introduction, mixing the sample with a fluid containing a predetermined amount of the second chemical species, the second chemical species in the fluid but not the second chemical species in the sample being linked to a chemiluminescent label, said determination of said bound amount of said second chemical species from said sample comprising determining an amount of said chemiluminescent label bound within said channel.

64. A method according to claim 63, wherein the method further comprises

washing the mixture of the sample with the fluid from the channel, and introducing into the channel a reagent that triggers the label to undergo chemiluminescence.

65. An apparatus comprising, a first body having at least one groove formed therein, a second body having a surface that closes the at least one groove to form at least one channel, and a chemiluminescence detector positioned for detecting chemiluminescence in the at least one channel.

66. An apparatus according to claim 65, wherein the at least one channel has a maximum cross-sectional dimension of no more than 500 μm.

67. An apparatus according to claim 66, wherein the maximum dimension is no more than 300 μm.

68. An apparatus according to claim 66, wherein the maximum dimension is no more than 200 μm.

69. An apparatus according to claim 65, wherein the second body is releasably fixable to the first body, said closure of the at least one groove occurring when the bodies are fixed together.

70. An apparatus according to claim 65, wherein the first and second bodies are permanently fixed together.

71. An apparatus according to claim 65, wherein the at least one groove is formed in a planar surface of the first body, and wherein the surface of the second body is planar.

72. An apparatus according to claim 65, wherein the at least one channel

comprises at least two channel parts lying mutually side by side.

73. An apparatus according to claim 72, wherein the at least two channel parts comprise at least four channel parts that are mutually side by side, the at least four channel parts being connected in series by alternating left and right hand curved channel portions.

74. An apparatus according to claim 73, wherein said channel parts are mutually parallel.

75. A method of performing an assay involving binding between two chemical species comprising, providing an apparatus comprising a first body having at least one groove formed therein and a second body having a surface that closes the at least one groove to form at least one channel,
providing together in the at least one channel first and second chemical species capable of binding together, and
determining a measure of binding undergone between the first and second chemical species.

76. A method according to claim 75, wherein the at least one channel has a maximum cross-sectional dimension of no more than 500 μm.

77. A method according to claim 76, wherein the maximum dimension is no more than 300μm.

78. A method according to claim 77, wherein the maximum dimension is no more than 200μm.

79. A method according to claim 75, wherein said determination involves

measurement of chemiluminescence.